REMARKS

Claims 9, 15-19, 21-22 remain in the application. The Office Action indicated that Claims 10 and 16 were allowable if rewritten in independent form. Applicant has rewritten Claims 10 and 16 in independent form, and thus they are now allowable.

The Office Action objected to Claims 10 and 19 due to informalities. Applicant has amended Claims 10 and 19 to overcome the objections.

The Office Action rejected Claims 14, and 17-22 under 35 U.S.C. § 112 as being indefinite. Applicant has cancelled Claims 14 and 20, and amended the remaining Claims to overcome the rejection. However, with respect to Claims 17, 18, 21, and 22 Applicant respectfully traverses the rejection. The thermal element unit can be used in combination with the current detection units because the claims indicate that the thermal element unit detects when the temperature rises above a predetermined threshold while the current detection unit detects when the current rises above a predetermined threshold. There is nothing to suggest that temperature detection and current detection are mutually exclusive events. Instead, both detect potential problems for the LED module.

The present invention is directed towards providing a LED lighting device with a plurality of LED modules which can easily be replaced, which reduces the effects of an inoperative LED module, and which also reduces the effects of thermal degradation. The LED module 13 includes a constant current circuit unit 13a which can maintain a constant current to the LED module. Thus, even if the LED bare chips mounted on the LED module differ in terms of current rating, the LED module can still perform with stable luminous intensity. This allows for replacement of an LED module whose LED bare chip specifications differ from those at the

time the LED lighting device 1 was designed, especially since the LED modules are individually detachable from the LED lighting device 1. (Spec. Pg. 16, lns. 8-23).

Also, since the LED modules can be connected in parallel and have respective constant current circuit units, it is unnecessary for all of the LED modules to be mounted on the module socket. Instead, it is sufficient for only one or two of the LED modules to be mounted in order for the lighting device to be operable. (Pg. 11, ln. 28 – Pg. 12, ln. 7).

Furthermore, the LED module 15 can have a thermistor 15T in a constant current circuit 15a which can aid in monitoring and controlling the LED mounting unit 15b when the temperature rises above a predetermined level accordingly. (Pg. 19, ln. 17 - pg. 20, ln. 4; Fig. 8).

The Office Action rejected Claims 9, 14, and 15 under 35 U.S.C. § 103(a) as being unpatentable over *Katogi et al.* (U.S. App. No. 2002/0114155) in view of *Shirai* (U.S. 5,598,068) in further view of *Fai* (U.S. 6,144,160). Claim 9 was amended to incorporate the feature of Claim 14.

Katogi is directed towards reducing manufacturing costs and the effort and time required for cable routing. (¶¶ 0004-0005). It accomplishes this by allowing the main illumination unit 10 to be immediately adjacent sub illumination unit 100 and allowing sub illumination unit 100 to be immediately adjacent sub illumination unit 200. (Fig. 1). The connectors 21 at the end of the cable connection cord 20 of each illumination unit would connect with the connectors 21 of adjacent illumination units. (¶ 0039; Fig. 1). Through the connectors 21, the power supply circuit 50 in the main unit 10 can supply electric power to the sub units 100 and 200. Also, controller 40 of the main unit 10 can control the sub unit 100. (¶ 0052).

Katogi does not teach or suggest wherein each of the LED modules comprise "a power supply terminal provided on the main surface of the main substrate, and operable to receive

power from an electric power source." The Office Action cites to power supply circuit 50 as the power supply terminal. However, as seen in Figure 2, only main illumination unit 10 has a power supply circuit 50. Sub illumination units 100 and 200 lack the power supply circuit 50. Thus, *Katogi* does not teach that each of the LED modules comprise a power supply terminal. Furthermore, it would not be obvious to include the power supply terminal for every single one of the sub illumination units since the goal of *Katogi* is to reduce the amount of cable routing necessary. By including only a singular power supply circuit 50, the cable routing of the system is reduced because each sub illumination unit only needs to connect to another sub illumination unit or the main illumination unit 10 instead of an outside power source.

In contrast, in the present invention, each LED module has terminal 127 which connects with terminal 25 of the module socket 20 as shown in Figure 1. (Pg. 10, ln. 25 – Pg. 11, ln. 1; Fig. 2).

Katogi also does not disclose wherein each of the LED modules comprise "a luminous intensity stabilization circuit connected electrically to the power supply terminal and the LED mounting unit." The Office Action cites to the control circuit 40 as the luminous intensity stabilization circuit and acknowledges that sub illumination units 100 and 200 do not contain control circuit 40. Although the Office Action asserts that it would have been obvious to use a plurality of main units 10, doing so would teach away from Katogi.

> A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley,* 27 F.3d 551, 553 (Fed. Cir. 1994); *see KSR*, 127 S. Ct. at 1739-40 (explaining that when the prior art teaches away from a combination, that combination is more likely to be nonobvious). Additionally, a reference may teach away from a use when that use would render the result inoperable. *McGinley v. Franklin Sports, Inc.,* 262 F.3d 1339, 1354 (Fed. Cir. 2001).

In re Icon Health and Fitness, Inc. 2007 U.S. App. Lexis 18244, *10

By using only main units 10, the manufacturing costs for *Katogi* will rise drastically as control circuits and power supplies can be expensive to manufacture, install, and maintain. Since *Katogi* is directed towards reducing the costs of manufacturing, using the plurality of main units 10 will teach away from the objectives of *Katogi*. (¶ 0004, 0054) Furthermore, the use of all main units 10 will require each of the main units 10 to have its own cable for direct connection to an outside power source. This would lead away from *Katogi*'s objective of reducing the time and effort of for cable routing.

In contrast, in the present invention, each of the LED modules has a luminous stabilization circuit. As seen in Figure 3, the luminous stabilization circuits area constant current circuit units 11a, 12a, and 13a. (Pg. 11, lns. 25 – 27; Fig. 3). Since the LED modules 11, 12 and 13 are connected in parallel and have respective constant current circuit units 11a, 12a and 13a, it is not necessary for all three of the LED modules 11, 12 and 13 to be mounted on the module socket 20. (Pg. 11, ln. 28 – Pg. 12, ln. 7). This allows the LED modules 11, 12, and 13 to be removed, or for the LED lighting device 1 to remain functional even if one of the LED modules 11, 12, and 13 becomes operationally defective.

Neither *Katogi, Shirai*, or *Fai* teach or suggest "wherein when at least one of the LED bare chips in any one of the LED modules rises in temperature to a predetermined temperature or higher, the luminous intensity stabilization circuit stops current to the one LED module independently from any other LED modules in the plurality of LED modules, according to a judgment signal from the first comparator based on detected temperature information from the thermal element."

The Office Action admits that *Katogi* does not teach a thermal element, thus *Katogi* does not disclose stopping the current to an LED module if the temperature of the LED module rises above a predetermined temperature.

Shirai is directed towards reducing the number of current sources configured so that a broken LED and/or current source does not affect other LEDs and/or current sources. It also adjusts the current flowing through the LEDs as a function of temperature to prolong the LED lifetime. (Col. 2, lns. 7 – 13).

In *Shirai*, when the environmental temperature of the LEDs rise, the resistance of the thermistor 64 reduces and the bias voltage produced by the bias circuit decreases. Then the current from each current source decreases and overcurrent does not flow through the LED to improve the lifetime of the LEDs. The reduced current value "is determined to satisfy the forward current derating curve characteristic." (Col. 5, lns. 19 – 26). Thus, although *Shirai* may reduce the current from flowing through the LED, there is no indication that it stops current from flowing through a particular LED module. In addition, *Shirai* does not disclose stopping the current from flowing through only a specific LED module rather than all of the LED modules. *Shirai* also only discloses the use of a light emitting apparatus with a plurality of LEDs rather than a plurality of LED modules. *Shirai* also does not disclose that the LED lighting modules are detachable.

Furthermore, the Office Action also admits that neither *Katogi* nor *Shirai* utilizes a comparator and cites to *Fai* for the comparator.

Fai is directed towards providing a fire-safe lamp with a temperature-controlled automatically protecting circuit wherein the protection circuit includes a maintaining circuit which can respond to not only temperature increase but also other troubles in the circuit. (Col. 2,

lns. 26 – 43). This is to prevent a Torchiere Lamp from getting too hot and burning flammable material near it such as curtains.

In *Fai*, however, the temperature sensors D_{21}, D_{22}, D_{23}, and D_{24} are enclosed in metal tubes 4. As can be seen in Figure 6, metal tubes 4 are not near the individual LEDs. Furthermore, once the temperature increase too high, all of the LEDs are shut off rather than a specific LED module. *Fai* does not disclose multiple LED modules and furthermore, even if there are multiple LED modules, it is desirable in *Fai* to shut off all of the LED modules as a safety precaution in order to prevent fires from happening. In addition, there is no indication in Fai that the LED modules are detachable so that only individual LED modules rather than all of the LEDs can be replaced.

In contrast in the present invention, the thermal elements are near the LED bare chips. In addition, only the LED module which has the abnormal temperature has its current stopped. This allows the other LED modules to function despite the failure of an LED module. Furthermore, by having each LED module be detachable, if one of the LED modules fail, it can easily be replaced. This obviates the necessity of having to replace the whole LED lighting device 1. This is particularly useful since LED lighting devices can be mounted and be hard to remove. Furthermore, it reduces the costs of returning the LED lighting device to fully functional status since replacing one defective LED lighting module is cheaper than replacing a complete LED lighting device.

Furthermore, neither *Katogi*, *Shirai*, or *Fai* are directed towards solving the problem of the present invention. Thus, one highly relevant inquiry in making an evaluation under 35 U.S.C. §103 is "[t]he relationship between the problem which the inventor. . . was attempting to solve and the problem to which any prior art reference is directed." *Stanley Works v. McKinney*

Mfg. Co., 216 USPQ, 298, 304 (Del. D.C. 1981). Thus, in analyzing the prior art under Section 103 of the Act, we must clearly comprehend the problem addressed by the present inventors and that problem must be compared or contrasted, as the case may be, with the problems addressed by the prior art.

The present invention seeks is directed towards an LED lighting device with a plurality of LED modules which can easily be replaced, which reduces the effects of an inoperative LED module, and which also reduces the effects of thermal degradation in the present invention would.

In contrast, *Katogi* is directed towards reducing manufacturing costs and the effort and time required for cable routing. (¶¶ 0004-0005). Thus, *Katogi* does not address the problem of providing an LED lighting device which has all three features of LED modules which can easily be replaced, which reduces the effects of an inoperative LED module, and which also reduces the effects of thermal degradation in the present invention would.

Shirai is directed towards reducing the number of current sources configured so that a broken LED and/or current source does not affect other LEDs and/or current sources. (Col. 2, lns. 7 – 13). *Shirai*, however, does not address the problem of LED modules which can easily be replaced since it does not contemplate utilizing multiple LED modules or having LED modules which are detachable. Rather it only appears to utilize a single fixed LED module.

Fai is directed towards providing a fire-safe lamp with a temperature-controlled automatically protecting circuit wherein the protection circuit includes a maintaining circuit which can respond to not only temperature increase but also other troubles in the circuit. (Col. 2, lns. 26 – 43). *Fai* is not concerned with utilizing multiple LED modules or multiple LED modules that are detachable. That is because *Fai* is only concerned about preventing objects

around the lamp from catching fire. This evidenced by the fact that the temperature sensors in Fai are not near the LEDs but rather are in the tube 4 where objects would most likely come into contact with the lamp and potentially catch fire.

Furthermore, there is no motivation to combine the references. The Federal Circuit has held that a person of ordinary skill in the art must not only have had some motivation to combine the prior art teachings, but some motivation to combine the prior art teachings in the particular manner claimed. *See, e.g., In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000) ("Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination *in the manner claimed.*" (emphasis added)); *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) ("In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination *in the manner claimed.*" (emphasis added)).

A person having ordinary skill in the art seeking to reduce manufacturing costs and the effort and time required for cable routing in *Katogi* would not look to a reference seeking to reduce the number of current sources configured so that a broken LED and/or current source does not affect other LEDs and/or current sources in *Shirai* or to a reference to provide a fire-safe lamp with a temperature-controlled automatically protecting circuit wherein the protection circuit includes a maintaining circuit which can respond to not only temperature increase but also other troubles in the circuit in *Fai*.

Furthermore, even if the inventions were combined, however improperly, the resulting hypothetical combination would still not teach the features of the present invention. Notably, each of the LED modules would not have "a power supply terminal provided on the main surface

of the main substrate, and operable to receive power from an electric power source," "a luminous intensity stabilization circuit connected electrically to the power supply terminal and the LED mounting unit," or "wherein when at least one of the LED bare chips in any one of the LED modules rises in temperature to a predetermined temperature or higher, the luminous intensity stabilization circuit stops current to the one LED module independently from any other LED modules in the plurality of LED modules, according to a judgment signal from the first comparator based on detected temperature information from the thermal element."

The Office Action rejected Claim 19-20 under 35 U.S.C. § 103(a) as being unpatentable over *Katogi* in view of *Nomiya et al.* (U.S. 4,068,148).

All arguments for patentability with respect to Claim 9 are repeated and incorporated herein for Claims 19. Furthermore *Nomiya* does not remedy the deficiencies of *Katogi.*

Nomiya is directed towards a constant current driving circuit for driving light emitting diodes which comprises insulated gat type field effect transistors. (Col. 1, lns. 5-9). *Nomiya* does not disclose the use of multiple LED modules, or that each individual LED module is individually detachable from the LED lighting device. Furthermore, there is no indication that *Nomiya* stops the voltage supply through only a specific LED module that has failed as opposed to all of the LED modules. *Nomiya* is also unconcerned with stopping the voltage supply based on thermal characteristics of the LED modules.

Claims 15 and 22 depend from and further define Claim 9 and 21 respectively and are thus allowable, too.

In view of the amendments and the above remarks, it is believed the case is now in condition for allowance and early notification of the same is requested.

If the Examiner believes a telephone conference would assist in the prosecution of the matter, the undersigned attorney can be contacted at the listed telephone number.

Very truly yours,

SNELL & WILMER L.L.P.

Edward Y. Lin
Registration No. 58,567
600 Anton Boulevard, Suite 1400
Costa Mesa, CA 92626
Telephone: (714) 427-7508
Facsimile: (714) 427-7799